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REPORT BY THE U.S.

General Accounting Office

Ravenna Army Ammunition Plant: Analysis Of Army's Justification To Retain Depot Storage Area

At the request of the Chairman of the House Committee on Armed Services and of Congressman Dennis E. Eckart and a request by Senator John Glenn, GAO reviewed the Army's justification and need for retaining the depot storage area at the Ravenna Army Ammunition Plant, an inactive ammunition production and storage site near Ravenna, Ohio. The Governor of Ohio had proposed using the plant for a privately owned industrial park if the Army did not need the property.

The Army's justification does not support retaining about 4,800 of the 6,919 acres in the depot storage area. The 4,800 acres contain 294 earth-covered igloos for storing explosives and ammunition. The need for 1,000 acres within the depot storage area, which are in addition to the 4,800 acres, is questionable. This area is now used by the Ohio National Guard for training, and according to Army officials, an ammunition production line would be built in the area during mobilization.

Army officials agreed that the justification did not support retaining the entire depot storage area. But they said the Army must do a study which would consider the Army's overall storage needs before they could conclude whether any areas at Ravenna were excess.



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NATIONAL SECURITY AND
INTERNATIONAL AFFAIRS DIVISION

B-220294

The Honorable Les Aspin
Chairman, Committee on Armed Services
House of Representatives

The Honorable Dennis E. Eckart
House of Representatives

The Honorable John Glenn
United States Senate

This report responds to your requests that we review the Army's justification and need for retaining the Ravenna Army Ammunition Plant, an inactive ammunition production and storage site near Ravenna, Ohio. Ohio Governor Richard F. Celeste had proposed using the plant for a privately owned industrial park if the Army did not need the property.

Ravenna is 1 of 25 Army ammunition plants operated by contractors. Fourteen plants are operating and 11--like Ravenna--are idle and are retained for use in case of a national emergency. Of the 21,419 acres at Ravenna, the ammunition production area covers 14,500 acres at the east end of the installation and the depot storage area covers the remaining 6,919 acres.

On April 30, 1985, we provided Congressman Eckart and your offices information on the Army's justification for the ammunition production facilities at Ravenna. We pointed out that the plant was scheduled to produce 10 different ammunition items during wartime, including mines, fuzes, detonators, and projectiles. However, the plant lacks production equipment for 8 of the 10 assigned ammunition items. Therefore, production lines for these items would not be started as quickly as needed for mobilization production. This condition is not unique to Ravenna; it exists at other Army ammunition plants, as discussed in our report to the Secretary of the Army entitled Observations Regarding the Ammunition Production Base (GAO/PLRD-83-38, Feb. 1, 1983).

As agreed at the April 1985 meeting, we discontinued our assessment of the Army's justification for the production area and focused on evaluating the justification for retaining the

6,919 acres and facilities constituting the depot storage area. In addition, as agreed, we inquired whether sanitary landfill sites within the depot storage area contained hazardous or toxic wastes. This letter and appendixes discuss our findings.

FINDINGS AND CONCLUSIONS

There are 453 earth-covered igloos for storing explosives and ammunition on the 6,919 acres of land in the depot storage area. We reviewed the Army's justification and supporting data and concluded that 294 of the igloos, and the 4,800 acres of land on which these igloos are located, could be exceeded without affecting

- storage, burning, and demolition operations in the production area;
- the proposed sites for a container facility and ammunition production line;
- training by the National Guard; and
- the capability to receive and ship ammunition and explosives by truck.

Our conclusion is based on two factors. First, the estimated number of igloos needed to store bulk explosives during peacetime is too high because planned shipments of bulk explosives on hand from Ravenna were not included in the Army's computations and the quantities scheduled for delivery to Ravenna were overstated. Second, the Army's computation assumes that both peacetime and wartime stocks would be on hand at the same time. However, we determined that igloos needed to store explosives for peacetime production would be available to store ammunition end items during a war because peacetime stocks would be used during production or shipped to other plants.

The need for 1,000 acres within the depot storage area, which are in addition to the 4,800 acres, is questionable. This area is now used by the Ohio National Guard for training and, according to Army officials, an ammunition production line would be built in the area during mobilization.

In our view, the Army's estimate of its mobilization requirements supports the need for the production line to be built during mobilization. However, to decide whether the line should be located within the 1,000 acres, elsewhere at Ravenna, or at another plant would require further analysis. The General

Services Administration (GSA), however, completed a survey of the Ravenna plant in July 1985, and according to GSA officials, GSA plans to recommend that the Army release the 1,000 acres for disposal. GSA officials questioned using mobilization requirements as a basis for retaining vacant land and have requested policy guidance from the Office of Management and Budget. GSA officials said ample land was available for National Guard training in other areas at Ravenna and elsewhere in Ohio. Army officials, however, maintained that mobilization requirements supported the need for an additional ammunition production line and that the 1,000-acre parcel should be retained for that purpose.

Assessments of Ravenna in 1978 and 1981 by the U.S. Army Toxic and Hazardous Materials Agency indicated that the depot storage area had not been used for sanitary landfill. In fact, the reports stated that a quarry in the area had been used as a dump site possibly for acid disposal, and that one section within the depot storage area might contain unexploded ammunition and buried mustard gas. Army officials said that the U.S. Army Toxic and Hazardous Materials Agency would have to do a thorough survey to determine the type and degree of contamination in the depot storage area.

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On July 19, 1985, we briefed Congressman Eckart and the offices of the other requestors on the above findings and conclusions. As requested, we did not ask the Departments of Defense and the Army to review and comment on a draft of this report, but we did discuss the contents with Army officials and incorporated their comments where appropriate.

Army officials agreed with our analysis that the Army's justification overstated the igloo requirements because planned shipments of bulk explosives from Ravenna were excluded and planned deliveries were overstated. They also agreed with our conclusions that the justification did not support a need for about half the earth-covered igloos at Ravenna and that about 4,800 acres of land in the depot storage area were potentially excess. They said that igloos used to meet peacetime storage needs could be used during mobilization and that their computations should have considered such dual use. They also said that Ravenna would continue to be used as interim storage point for bulk explosives in support of peacetime production but that they were not certain about the quantities that would be shipped to Ravenna in the future. Although Army officials agreed with our findings and conclusions, they said that the

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Army must do a study of its overall explosives and ammunition storage needs and capacities in order to determine whether some of the storage facilities at Ravenna were excess.

As arranged with your offices, unless you publicly announce its contents earlier, we plan no further distribution of this report until 14 days from the date of the report. At that time we will send copies to interested parties and make copies available to others upon request.



Frank C. Conahan
Director

OBJECTIVES, SCOPE, AND METHODOLOGY

Our objective was to review the Army's justification for retaining the Ravenna Army Ammunition Plant as requested by the Chairman of the House Armed Services Committee, Representative Dennis Eckart, and Senator John Glenn.

In assessing the need for the 11 ammunition production lines at Ravenna, we reviewed the mobilization work load in the fiscal years 1981-85 mobilization plans to determine whether Ravenna's work load was changing. We found that three ammunition items constituted most of the work load and that the work load for them remained constant. However, the number of items increased from 6 in fiscal year 1981 to 8 in fiscal year 1983 and to 10 in fiscal year 1985. We obtained the mobilization requirement for each item Ravenna was scheduled to produce in the fiscal year 1985 mobilization plan and compared it with the inventory at December 31, 1984. We reviewed the industrial preparedness plan for Ravenna to determine whether the production lines could be started when needed and found that the equipment needed to produce 8 of the 10 items was not at Ravenna. We toured the production area to get a firsthand look at the buildings, equipment, and support facilities.

On April 30, 1985, we briefed Congressman Eckart and the offices of the other requestors on our observations concerning the production facilities. Congressman Eckart concluded that it would be very difficult to challenge the need for the production facilities and asked us to limit our work to reviewing justification for retaining the depot storage area.

We obtained the Army's justification for retaining the depot storage area from the U.S. Army Armament, Munitions and Chemical Command (AMCCOM), Rock Island, Illinois. A major reason for retaining the area was the need for the earth-covered igloos for storing explosives and ammunition. Therefore, we did a detailed analysis of the Army's support for its current and projected future use of all the igloos at Ravenna (453 in the depot storage area and 230 in the production area). We tested the Army's estimate of igloo needs by reviewing information concerning shipments and receipts of explosives during peacetime. To test the Army's estimate of the number of igloos needed during mobilization for storing fixed quantities of explosives and ammunition items, we computed the number needed using applicable storage drawings and explosive limit factors. We met with officials at AMCCOM and the Ravenna plant to determine their methods for estimating igloo needs, obtain clarification on Army data, and discuss our observations.

To obtain a comprehensive understanding of igloo use and capacity, we determined how each igloo was being used during June 1985 and the total pounds of explosives which could be stored at Ravenna, taking into consideration the explosive limits for each igloo. We also determined how Ravenna storage facilities were being used compared with all other Army ammunition storage facilities.

We reviewed Army plans for building additional production lines at Ravenna during peacetime and mobilization and assessed their impact on the justification for the depot storage area.

Since GSA has responsibility for identifying unneeded federal real property, we reviewed studies it had done of Ravenna. We met with GSA officials in Chicago, Illinois, to discuss the results of their July 1985 study of Ravenna and their tentative report recommendations.

We discussed the possibility of hazardous or toxic materials being in the landfill within the depot storage area with AMCCOM and Ravenna plant officials. We reviewed reports prepared by the U.S. Army Toxic and Hazardous Materials Agency concerning contamination at Ravenna.

We did our review between April and July 1985 in accordance with generally accepted government auditing standards.

ANALYSIS OF THE ARMY'S JUSTIFICATION FOR
RETAINING THE DEPOT STORAGE AREA AT THE
RAVENNA ARMY AMMUNITION PLANT, RAVENNA, OHIO

The depot storage area covers 6,919 of the 21,419 acres at the Ravenna Army Ammunition Plant. It is situated at the west end of the installation and contains 453 earth-covered igloos for storing ammunition and explosives, 8 magazines for storing production items, platforms for shipping and receiving explosives and ammunition by truck, and administration buildings for supporting depot operations. It also contains a largely vacant 1,000-acre section used by the Ohio National Guard for training.

The 453 igloos are clustered into 5 blocks and, as of June 1985, were being used in varying degrees, as shown in table II.1.

Table II.1

Location and Utilization of Igloos in
the Depot Storage Area as of June 1985

<u>Block</u>	<u>Number of igloos</u>		
	<u>Total</u>	<u>In use</u>	<u>Empty</u>
A	100	6	94
B	95	40	55
C	99	66	33
D	99	94	5
E	<u>60</u>	<u>49</u>	<u>11</u>
Total	<u>453</u>	<u>255</u>	<u>198</u>

The igloos are all about 26.5 feet wide but vary in length. The igloos in Block A are 80 feet long, and the remainder are 60 feet long. Current regulations permit storing up to 250,000 pounds of explosive material in each igloo.

ARMY'S JUSTIFICATION FOR RETAINING
THE ENTIRE DEPOT STORAGE AREA

The Army's justification states that excessing the entire depot storage area would impact the Army's ammunition production capability, thereby hampering the Army from performing its mission and possibly jeopardizing national defense.

The justification cites a need for 779 earth-covered igloos for storing explosives and ammunition items during peacetime and mobilization, as shown in table II.2. (There are 683 igloos at Ravenna--453 in the depot storage area and 230 in the ammunition production area.)

Table II.2

Army's Projected Requirements
for Earth-Covered Igloos

<u>Item</u>	<u>Quantity</u> (pounds)	<u>No. of igloos</u> <u>required</u>
<u>Peacetime storage:</u>		
Bulk explosives on hand:		
Nitroguanidine	2,000,000	
M1 propellant	8,000,000	
Composition B	45,000,000	
TNT	12,000,000	
Black powder	500,000	
Total	<u>67,500,000</u>	309
Bulk explosives on contract:		
Nitroguanidine	4,000,000	
Composition B	<u>19,000,000</u>	
Total	<u>23,000,000</u>	155
Bulk explosives not funded:		
Composition A	3,800,000	
Composition A5	5,000,000	
LX 14	<u>600,000</u>	
Total	<u>9,400,000</u>	<u>37</u>
Total igloos, peacetime		<u>501</u>
<u>Mobilization storage:</u>		
Bulk explosives in support of production	21,000,000	85
Ammunition items	-	<u>193</u>
Total igloos, mobilization		<u>278</u>
Grand total, igloos		<u>779</u>

Other reasons cited by the Army for retaining the entire depot storage area were as follows:

- Ravenna's only capability for receiving and shipping ammunition and explosives by truck is in the depot storage area. If the entire area is exceeded, this capability would be lost.
- Storage, burning, and demolition operations in the production area would be adversely impacted because the storage area provides a buffer between these operations and the property line. The property line would be too close to these potentially hazardous operations if the entire area is exceeded.
- The Army is considering building a facility for shipping ammunition in containers in the depot storage area.
- An ammunition production line needed to meet mobilization requirements would be built on the largely vacant 1,000-acre parcel during a major war. Further, the Ohio National Guard uses this parcel for training under a current lease that expires in March 1988.

GAO ANALYSIS OF JUSTIFICATION

We reviewed the Army's justification and supporting data and concluded that the 230 igloos in the production area, together with the 159 igloos in Blocks D and E, should more than satisfy the Army's storage needs at Ravenna (i.e., 389 rather than 779). The remaining 4,800 acres, incorporating 294 igloos in Blocks A, B, and C, have the potential to be exceeded without affecting

- storage, burning, and demolition operations in the production area;
- the proposed sites for a container facility and ammunition production line;
- training by the National Guard; and
- the capability to receive and ship ammunition and explosives by truck since such capability would remain at Blocks D and E.

The Army's projected requirement, we believe, is overstated because of two factors. First, the estimate of 501 igloos to store bulk explosives during peacetime is too high because

planned shipments of bulk explosives on hand from Ravenna were not included in the Army's computations and the quantities scheduled for delivery to Ravenna were overstated. Second, the Army's computation assumes that both peacetime and wartime stocks would be on hand at the same time. However, we determined that igloos needed to store explosives for peacetime production would be available to store ammunition end items during a war because peacetime stocks would be used during production or shipped to other plants.

Estimate of 501 igloos needed for peacetime storage of bulk explosives is overstated

The Army estimated that it needed 501 igloos for storing bulk explosives at Ravenna during peacetime. The estimate includes 309 igloos for storing 67.5 million pounds of bulk explosives on hand, 155 igloos for storing 23 million pounds of explosives on contract and scheduled for delivery to Ravenna, and 37 igloos for 9.4 million pounds of explosives not yet funded but scheduled for delivery to Ravenna.

According to Army officials, the Ravenna plant is used for temporary storage of bulk explosives used for peacetime production and therefore both ships and receives explosives. The Army's estimate, however, did not consider planned shipments of bulk explosives from Ravenna, and scheduled deliveries to Ravenna are overstated.

The Army plans to ship most of the bulk explosives on hand--the 2 million pounds of nitroguanidine and the 45 million pounds of composition B--from Ravenna to other ammunition plants to meet production schedules, as needed. These shipments represent a significant portion of bulk explosives on hand and consequently decrease the number of igloos needed. In addition, the Army erroneously included igloo storage requirements for 8 million pounds of M1 propellant that will be sent to the Indiana Army Ammunition Plant by January 1986. Since the propellant is not stored in igloos, these shipments will not affect igloo needs. Concerning receipts of bulk explosives, the 4 million pounds of nitroguanidine on contract will be sent directly to the Radford Army Ammunition Plant in Virginia rather than to Ravenna and 5.3 million pounds--rather than 19 million pounds--of Composition B are destined for Ravenna. Army officials said decisions had not been made on (1) whether funding would be provided for the 9.4 million pounds of bulk explosives not yet funded and (2) whether that quantity would be shipped to Ravenna.

In table II.2, the Army indicated it needed the 309 igloos currently used to store explosives plus 155 igloos for explosives due in on contract and 37 igloos for explosives not yet funded. However, our analysis shows that the quantity of explosives currently on hand is the maximum amount that will be stored at Ravenna since quantities due to be shipped from Ravenna exceed quantities due in. Therefore, we concluded that the 309 igloos currently used was the maximum number needed.

Adding igloos needed during mobilization to those needed during peacetime overstates total igloo needs

Army Regulation 700-90 requires that all ammunition plants like Ravenna have storage capacity for a 60-day supply of incoming materials needed to support production and for 90 days' production of finished products. Using this guidance, Army personnel estimated that Ravenna needed 278 igloos for mobilization storage--85 igloos for bulk explosives and 193 for ammunition items. They added the 278 igloos for mobilization storage to the estimated 501 igloos for peacetime storage of bulk explosives for a total estimate of 779 igloos. However, we believe this estimate is overstated because it does not reflect the fact that the igloos needed during mobilization would be used to store bulk explosives during peacetime. Igloos for storing newly produced ammunition items are not needed until well after mobilization begins. Army schedules indicate that it would take about 5 months after mobilization starts to complete the first finished ammunition items. According to Army officials, bulk explosives which are not needed to support production at Ravenna during mobilization would be sent to other ammunition plants, thus making room for storing ammunition items.

We estimated the number of igloos needed during mobilization using applicable storage drawings and safety factors. Table II.3 compares our estimates with Army estimates.

Table II.3

Estimated Requirements for Igloos During Mobilization

<u>Item</u>	<u>GAO estimate</u>	<u>Army estimate</u>
Bulk explosive	76	85
Ammunition items	<u>253</u>	<u>193</u>
Total	<u>329</u>	<u>278</u>

We did not try to reconcile the differences between our estimate and the Army's for bulk explosives because they are reasonably close. In projecting its needs for storing ammunition items, the Army assumed some would be stored in 80-foot-long igloos. Because the 80-foot igloos are located in Block A (which we conclude may be exceeded), we based our computations on using only 60-foot igloos. This accounted for most of the difference and resulted in our higher projected needs. Both estimates assume that two additional ammunition production lines would be built at Ravenna during mobilization.

Area used by Ohio National Guard for Training

The justification for an additional parcel of largely vacant land covering about 1,000 acres is questionable. The area is currently used by the Ohio National Guard for training, and according to Army officials, an ammunition production line would be built in the area during mobilization. The current mobilization requirement certainly supports the need for a production line. To determine whether the line should be located within this parcel, elsewhere at Ravenna, or at another ammunition plant requires an analysis beyond the scope of this review. However, the General Services Administration (GSA) completed a survey of the Ravenna plant in July 1985 and plans to recommend that the Army release this parcel for disposal. GSA officials questioned using mobilization requirements as a basis for retaining vacant land and have requested policy guidance from the Office of Management and Budget. GSA officials said ample space was available for National Guard training at Ravenna and elsewhere in Ohio.

DEPOT STORAGE AREA WAS NOT USED FOR SANITARY LANDFILL, BUT SECTIONS MAY BE CONTAMINATED

The U.S. Army Toxic and Hazardous Materials Agency did a records search at Ravenna in 1978 and 1981 to identify contaminated areas. The 1978 assessment disclosed two sanitary landfills--both in the ammunition production area. This assessment indicated, however, that a portion of the 1,000 acre parcel discussed above was used for demolition of munitions between 1945 and 1949 and may contain unexploded ammunition. In addition the assessment indicated that mustard gas might have been buried in this demolition area. The 1981 assessment revealed that a quarry located in Block C was used as a dump and possible acid disposal site in the 1950's.

According to a plant official, the depot storage area has not been used for sanitary landfill subsequent to the two assessments. Army officials said that the U.S. Army Toxic and

Hazardous Materials Agency would have to do a thorough survey to identify the types and degree of contamination in the depot storage area.

CONCLUSIONS

The Army's justification does not support a need for retaining the total depot storage area for storing bulk explosives during peacetime and bulk explosives and ammunition items during mobilization. Because the igloos used during peacetime to store bulk explosives could be used during mobilization, the higher number needed during mobilization would be enough to meet both peacetime and mobilization needs. We believe the 230 igloos in the production area, together with the 159 igloos in Blocks D and E, should more than satisfy the Army's storage needs at Ravenna. The remaining 4,800 acres of land at the west end of the storage area on which 294 igloos in Blocks A, B, and C are located have the potential to be exceeded. Such excessing would not affect storage, burning, and demolition operations in the production area because the area surrounding Blocks D and E which adjoins the production area would provide the necessary safety buffer. Also, the proposed sites for an ammunition production line and container facility, as well as the National Guard training area, are not located within the 4,800 acres. In addition, the capability to receive and ship explosives and ammunition by truck would remain at Blocks D and E. Finally, the need for 1,000 acres within the depot storage area, which are in addition to the 4,800 acres, is questionable.

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